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Technological advancements in animal healthcare: Smart monitoring and disease prevention.

Rachel Martinez*

Department of Veterinary Sciences, University of Lisbon, Portugal

***Correspondence to:** Rachel Martinez, Department of Veterinary Sciences, University of Lisbon, Portugal. E-mail: r.martinez@vetmed.univlisboa.edu

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Introduction

In recent years, the animal healthcare industry has witnessed significant progress due to the integration of modern technologies. These innovations are transforming the way veterinarians and animal caregivers monitor, diagnose, and treat animals. Smart monitoring systems, wearable devices, artificial intelligence (AI), and telemedicine are revolutionizing both companion and livestock animal healthcare, ensuring improved outcomes and early disease detection [1].

One of the most notable innovations is the use of wearable monitoring devices for animals. These devices, similar to fitness trackers used in humans, collect real-time data on body temperature, heart rate, respiratory rate, activity level, and even behavior patterns. For example, smart collars and halters are now widely used in livestock farming to detect early signs of illness or stress. Such continuous monitoring helps in early intervention, reducing the risk of disease outbreaks and mortality [2].

Artificial Intelligence (AI) and machine learning algorithms are increasingly used to analyze the large volumes of data generated by these devices. AI can detect subtle changes in an animal's behavior or physiological condition, which may not be easily noticeable by the naked eye. This predictive capability allows veterinarians and farmers to make data-driven decisions and prioritize care for at-risk animals, ultimately improving herd health and productivity [3].

Another breakthrough is the advancement of telemedicine in veterinary practice. Especially in rural or underserved areas, telemedicine has improved access to veterinary consultations and follow-ups. Remote diagnostics and virtual assessments can now be conducted using video calls and digital medical records, allowing quicker responses to animal health issues without geographical constraints [4].

Biosensors and lab-on-a-chip technologies are also gaining popularity in both research and clinical settings. These miniature diagnostic tools allow for rapid testing of blood, urine, or saliva, facilitating immediate diagnosis of infections, metabolic disorders, or nutritional deficiencies. For instance, early detection of mastitis in dairy cattle or parasitic infections in dogs can now be accomplished in minutes, aiding timely treatment [5].

Conclusion

In conclusion, technological advancements in animal healthcare are reshaping the way diseases are detected and managed. As these innovations become more accessible and integrated into standard practice, they promise to elevate the standard of care, reduce animal suffering, and promote a healthier relationship between humans and animals across all sectors.

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